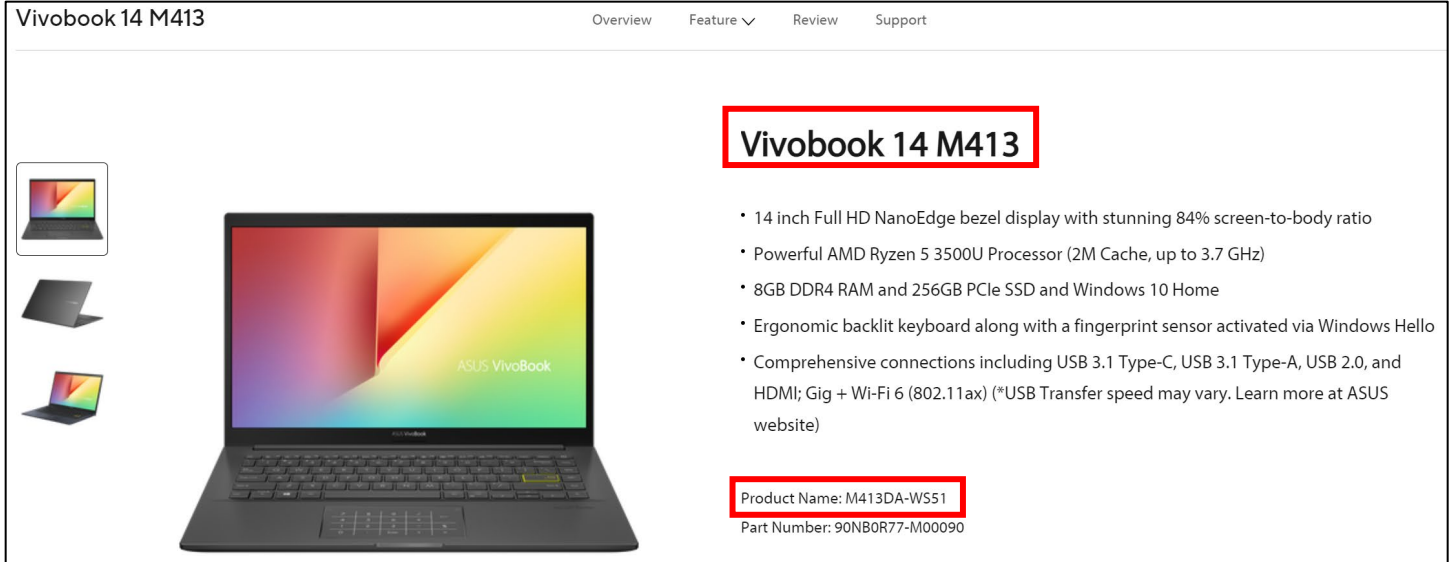








Exhibit 6: U.S. Patent No. 7,956,581

Claims	Identification		
<p>10[pre] A method of operating a rechargeable battery pack, comprising::</p>	<p>To the extent the preamble is limiting, Asus-branded devices practice a method of operating a rechargeable battery pack, comprising:.</p> <div data-bbox="520 315 1959 873">  </div> <div data-bbox="886 880 1596 958"> <table> <tr> <td>Battery</td> <td>42WHrs, 3S1P, 3-cell Li-ion</td> </tr> </table> </div> <p>See, e.g., <i>Vivobook 14 M413</i>, Asus, https://shop.asus.com/us/90nb0r77-m00090-vivobook-14-m413.html (last visited Feb. 20, 2024).</p> <div data-bbox="592 1073 1890 1219"> <p>Battery instructions</p> <p>ASUS battery of laptops utilize Li-ion battery which has no battery memory effect, and the system is able to prevent over-charge/excessive discharge/charge temperature control.</p> </div> <p>See, e.g., <i>[Notebook] Battery and Power Adapter (Charger) Specifications and Recommended Usage</i>, Asus (Dec. 8, 2023, 16:41), https://www.asus.com/support/faq/1015066/.</p>	Battery	42WHrs, 3S1P, 3-cell Li-ion
Battery	42WHrs, 3S1P, 3-cell Li-ion		

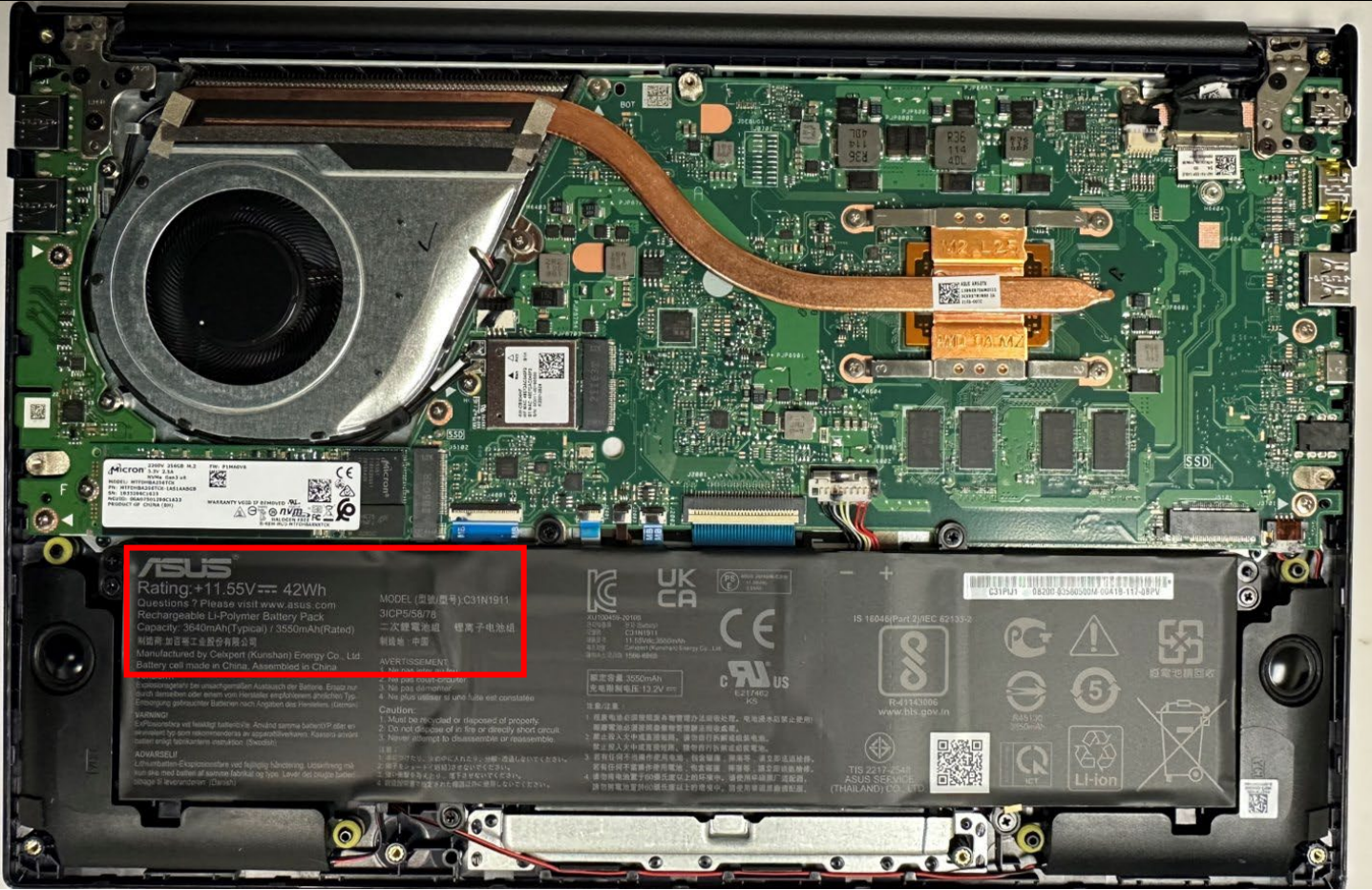
Claims	Identification																				
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   </div> <div style="text-align: center;"> <p>Test Report issued under the responsibility of:</p>  </div> </div> <div style="text-align: center; margin-top: 10px;"> <p>TEST REPORT IEC 62368-1 Audio/video, information and communication technology equipment Part 1: Safety requirements</p> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Report Number</td> <td>ASL19082825-003</td> </tr> <tr> <td>Date of issue</td> <td>2020-03-17</td> </tr> <tr> <td>Total number of pages</td> <td>62</td> </tr> <tr style="border: 2px solid red;"> <td style="border: 2px solid red;">Applicant's name</td> <td style="border: 2px solid red;">ASUSTEK COMPUTER INC</td> </tr> <tr style="border: 2px solid red;"> <td style="border: 2px solid red;">Address</td> <td style="border: 2px solid red;">1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan</td> </tr> <tr> <td>Test Item description</td> <td>Notebook PC</td> </tr> <tr> <td>Trade Mark</td> <td> (1)  or ASUSTek Computer Inc (2)  or adol </td> </tr> <tr> <td>Manufacturer</td> <td>Same as applicant.</td> </tr> <tr> <td>Model/Type reference</td> <td> X421xxxxxxxxxxxxxxxx, S433xxxxxxxxxxxxxxxx, K433xxxxxxxxxxxxxxxx, V433xxxxxxxxxxxxxxxx, S4600xxxxxxxxxxxxxxxx, ADOL14Fxxxxxxxxxxxxxxxx, X413xxxxxxxxxxxxxxxx, F413xxxxxxxxxxxxxxxx, A413xxxxxxxxxxxxxxxx, R428xxxxxxxxxxxxxxxx, VIVOBOK14xxxxxxxxxxxxxxxx, REDOLBOOK14xxxxxxxxxxxxxxxx, M433xxxxxxxxxxxxxxxx, D433xxxxxxxxxxxxxxxx, M413xxxxxxxxxxxxxxxx, D413xxxxxxxxxxxxxxxx, M4600xxxxxxxxxxxxxxxx, M4100xxxxxxxxxxxxxxxx, M4050xxxxxxxxxxxxxxxx, S413xxxxxxxxxxxxxxxx, K413xxxxxxxxxxxxxxxx, V413xxxxxxxxxxxxxxxx, V4100xxxxxxxxxxxxxxxx, V4050xxxxxxxxxxxxxxxx, R438xxxxxxxxxxxxxxxx, A415xxxxxxxxxxxxxxxx, ADOL14Jxxxxxxxxxxxxxxxx (x = A-Z, a-z, - or blank; y = 0-9, A-Z, a-z, - or blank, for marketing purpose and no impact safety related construction and critical components) </td> </tr> <tr> <td>Ratings</td> <td>19Vdc, 2.37A or 3.42A</td> </tr> </table>	Report Number	ASL19082825-003	Date of issue	2020-03-17	Total number of pages	62	Applicant's name	ASUSTEK COMPUTER INC	Address	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan	Test Item description	Notebook PC	Trade Mark	(1)  or ASUSTek Computer Inc (2)  or adol	Manufacturer	Same as applicant.	Model/Type reference	X421xxxxxxxxxxxxxxxx, S433xxxxxxxxxxxxxxxx, K433xxxxxxxxxxxxxxxx, V433xxxxxxxxxxxxxxxx, S4600xxxxxxxxxxxxxxxx, ADOL14Fxxxxxxxxxxxxxxxx, X413xxxxxxxxxxxxxxxx, F413xxxxxxxxxxxxxxxx, A413xxxxxxxxxxxxxxxx, R428xxxxxxxxxxxxxxxx, VIVOBOK14xxxxxxxxxxxxxxxx, REDOLBOOK14xxxxxxxxxxxxxxxx, M433xxxxxxxxxxxxxxxx, D433xxxxxxxxxxxxxxxx, M413xxxxxxxxxxxxxxxx , D413xxxxxxxxxxxxxxxx, M4600xxxxxxxxxxxxxxxx, M4100xxxxxxxxxxxxxxxx, M4050xxxxxxxxxxxxxxxx, S413xxxxxxxxxxxxxxxx, K413xxxxxxxxxxxxxxxx, V413xxxxxxxxxxxxxxxx, V4100xxxxxxxxxxxxxxxx, V4050xxxxxxxxxxxxxxxx, R438xxxxxxxxxxxxxxxx, A415xxxxxxxxxxxxxxxx, ADOL14Jxxxxxxxxxxxxxxxx (x = A-Z, a-z, - or blank; y = 0-9, A-Z, a-z, - or blank, for marketing purpose and no impact safety related construction and critical components)	Ratings	19Vdc, 2.37A or 3.42A
Report Number	ASL19082825-003																				
Date of issue	2020-03-17																				
Total number of pages	62																				
Applicant's name	ASUSTEK COMPUTER INC																				
Address	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan																				
Test Item description	Notebook PC																				
Trade Mark	(1)  or ASUSTek Computer Inc (2)  or adol																				
Manufacturer	Same as applicant.																				
Model/Type reference	X421xxxxxxxxxxxxxxxx, S433xxxxxxxxxxxxxxxx, K433xxxxxxxxxxxxxxxx, V433xxxxxxxxxxxxxxxx, S4600xxxxxxxxxxxxxxxx, ADOL14Fxxxxxxxxxxxxxxxx, X413xxxxxxxxxxxxxxxx, F413xxxxxxxxxxxxxxxx, A413xxxxxxxxxxxxxxxx, R428xxxxxxxxxxxxxxxx, VIVOBOK14xxxxxxxxxxxxxxxx, REDOLBOOK14xxxxxxxxxxxxxxxx, M433xxxxxxxxxxxxxxxx, D433xxxxxxxxxxxxxxxx, M413xxxxxxxxxxxxxxxx , D413xxxxxxxxxxxxxxxx, M4600xxxxxxxxxxxxxxxx, M4100xxxxxxxxxxxxxxxx, M4050xxxxxxxxxxxxxxxx, S413xxxxxxxxxxxxxxxx, K413xxxxxxxxxxxxxxxx, V413xxxxxxxxxxxxxxxx, V4100xxxxxxxxxxxxxxxx, V4050xxxxxxxxxxxxxxxx, R438xxxxxxxxxxxxxxxx, A415xxxxxxxxxxxxxxxx, ADOL14Jxxxxxxxxxxxxxxxx (x = A-Z, a-z, - or blank; y = 0-9, A-Z, a-z, - or blank, for marketing purpose and no impact safety related construction and critical components)																				
Ratings	19Vdc, 2.37A or 3.42A																				

Claims	Identification
	<p>Copy of marking plate:</p> <p>The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.</p> <p>[19Vdc, 2.37A]</p> <div data-bbox="716 316 1696 500"> </div> <p>Model Differences</p> <p>X421xxxxxxxxxxxxxxxx, S433xxxxxxxxxxxxxxxx, K433xxxxxxxxxxxxxxxx, V433xxxxxxxxxxxxxxxx, S4600xxxxxxxxxxxxxxxx, ADOL14Fxxxxxxxxxxxxxxxx, X413xxxxxxxxxxxxxxxx, F413xxxxxxxxxxxxxxxx, A413xxxxxxxxxxxxxxxx, R428xxxxxxxxxxxxxxxx, VIVOBOK14xxxxxxxxxxxxxxxx, REDOLBOOK14xxxxxxxxxxxxxxxx, M433xxxxxxxxxxxxxxxx, D433xxxxxxxxxxxxxxxx, M413xxxxxxxxxxxxxxxx, D413xxxxxxxxxxxxxxxx, M4600xxxxxxxxxxxxxxxx, M4100xxxxxxxxxxxxxxxx, M4050xxxxxxxxxxxxxxxx, S413xxxxxxxxxxxxxxxx, K413xxxxxxxxxxxxxxxx, V413xxxxxxxxxxxxxxxx, V4100xxxxxxxxxxxxxxxx, V4050xxxxxxxxxxxxxxxx, R438xxxxxxxxxxxxxxxx, A415xxxxxxxxxxxxxxxx, ADOL14Jxxxxxxxxxxxxxxxx (x = A-Z, a-z, - or blank; y = 0-9, A-Z, a-z, - or blank for marketing purpose and no impact safety related construction and critical components)</p> <p>All models are identical except for model designation</p>

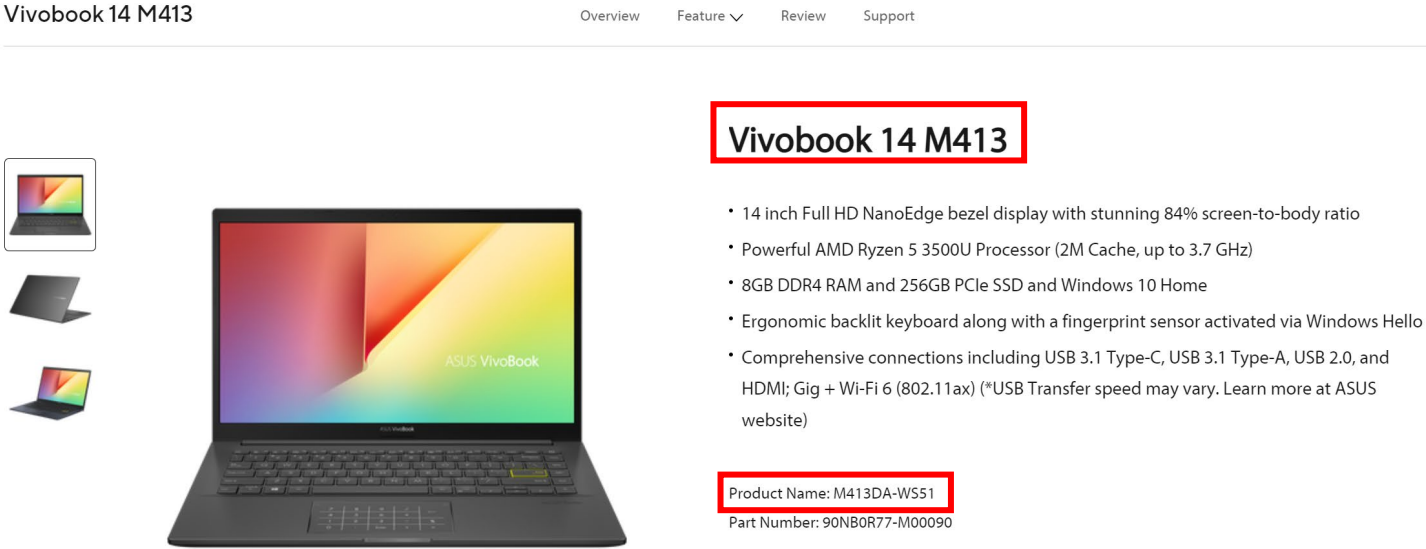

Claims	Identification																									
	<table><tr><td>4.1.2</td><td colspan="5">TABLE: List of critical components</td><td>P</td></tr><tr><td>Object / part No.</td><td>Manufacturer/ trademark</td><td>Type / model</td><td>Technical data</td><td>Standard</td><td>Mark(s) of conformity¹</td></tr><tr><td>Battery Pack</td><td>SIMPLO TECHNOLOGY CO LTD</td><td>C31N1905</td><td>11.55Vdc, 4335mAh or 4210mAh or 50Wh</td><td>UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition</td><td>UL, CB by Demko (DK-88058- UL, DK-88017- UL, DK-88066- UL)</td></tr><tr><td>Battery Pack (Alternate)</td><td>DYNAPACK INTERNATIONAL TECHNOLOGY CORP</td><td>C31N1905</td><td>11.55Vdc, 50Wh (for IEC 60950-1) 11.55Vdc, 50Wh or 4335mAh / 4210mAh (for IEC 62133)</td><td>UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition</td><td>UL, CB by Demko (DK-88548- UL, DK-88509- UL, DK-88694- UL)</td></tr></table>	4.1.2	TABLE: List of critical components					P	Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹	Battery Pack	SIMPLO TECHNOLOGY CO LTD	C31N1905	11.55Vdc, 4335mAh or 4210mAh or 50Wh	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-88058- UL, DK-88017- UL, DK-88066- UL)	Battery Pack (Alternate)	DYNAPACK INTERNATIONAL TECHNOLOGY CORP	C31N1905	11.55Vdc, 50Wh (for IEC 60950-1) 11.55Vdc, 50Wh or 4335mAh / 4210mAh (for IEC 62133)	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-88548- UL, DK-88509- UL, DK-88694- UL)
	4.1.2	TABLE: List of critical components					P																			
	Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹																				
	Battery Pack	SIMPLO TECHNOLOGY CO LTD	C31N1905	11.55Vdc, 4335mAh or 4210mAh or 50Wh	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-88058- UL, DK-88017- UL, DK-88066- UL)																				
Battery Pack (Alternate)	DYNAPACK INTERNATIONAL TECHNOLOGY CORP	C31N1905	11.55Vdc, 50Wh (for IEC 60950-1) 11.55Vdc, 50Wh or 4335mAh / 4210mAh (for IEC 62133)	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-88548- UL, DK-88509- UL, DK-88694- UL)																					

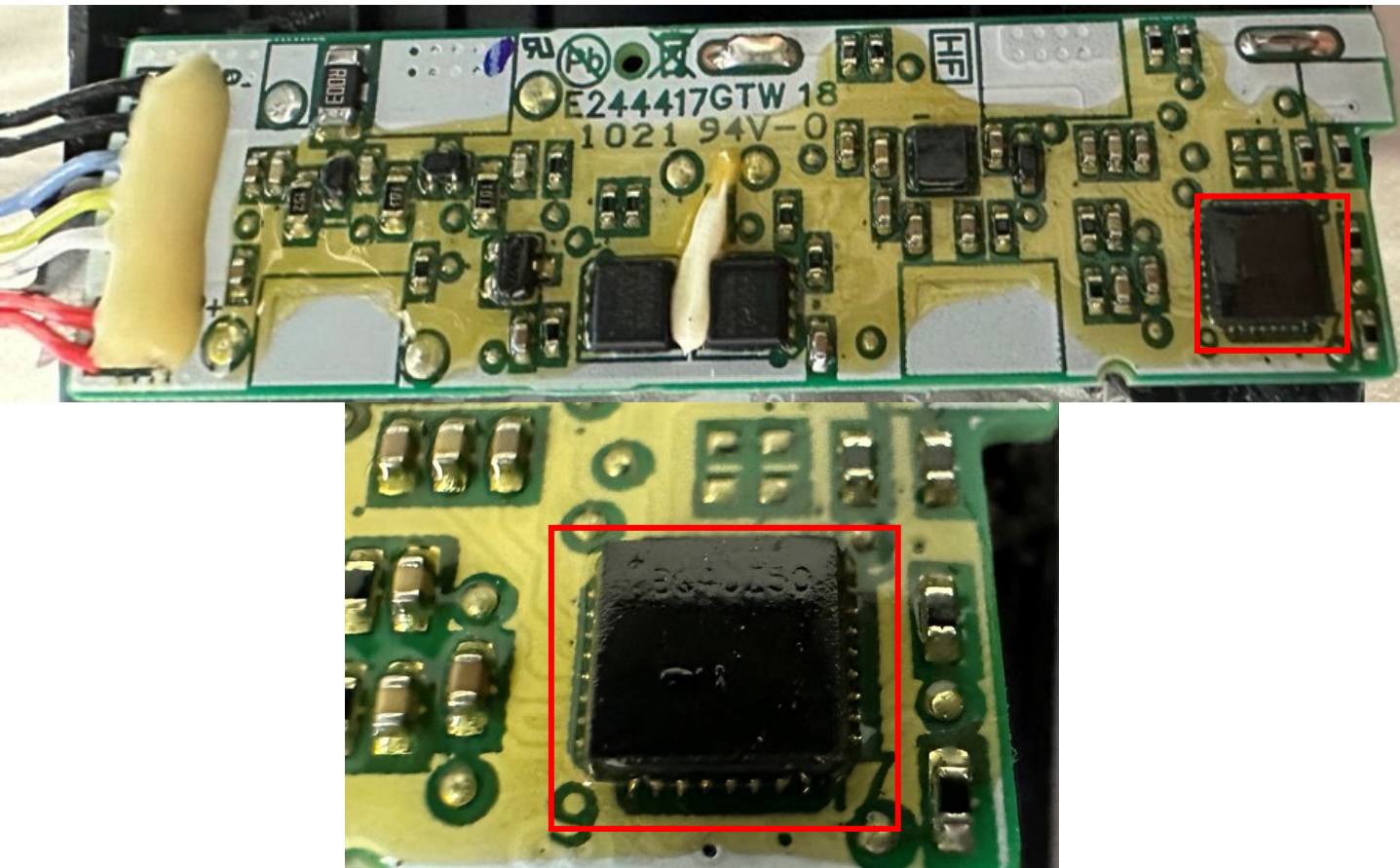
Claims	Identification																									
	<table><tr><th>4.1.2</th><th colspan="5">TABLE: List of critical components</th><th>P</th></tr><tr><th>Object / part No.</th><th>Manufacturer/ trademark</th><th>Type / model</th><th>Technical data</th><th>Standard</th><th>Mark(s) of conformity¹</th></tr><tr><td>Battery Pack (Alternate)</td><td>CELXP ERT ENERGY CORP</td><td>B31N1911</td><td>11.55Vdc, 42Wh or 3640mAh / 3550mAh</td><td>UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition</td><td>UL, CB by Demko (DK-90292- UL, DK-89997- UL, DK-90922- UL)</td></tr><tr><td>Battery Pack (Alternate)</td><td>CELXP ERT ENERGY CORP</td><td>C31N1911</td><td>11.55Vdc, 42Wh or 3640mAh / 3550mAh</td><td>IEC 60950- 1:2005/AMD2:20 13, EN 60950- 1:2006/A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition</td><td>UL, CB by Demko (DK-91479- UL, DK-91128- UL, DK-91884- UL)</td></tr></table>	4.1.2	TABLE: List of critical components					P	Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹	Battery Pack (Alternate)	CELXP ERT ENERGY CORP	B31N1911	11.55Vdc, 42Wh or 3640mAh / 3550mAh	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-90292- UL, DK-89997- UL, DK-90922- UL)	Battery Pack (Alternate)	CELXP ERT ENERGY CORP	C31N1911	11.55Vdc, 42Wh or 3640mAh / 3550mAh	IEC 60950- 1:2005/AMD2:20 13, EN 60950- 1:2006/A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-91479- UL, DK-91128- UL, DK-91884- UL)
4.1.2	TABLE: List of critical components					P																				
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹																					
Battery Pack (Alternate)	CELXP ERT ENERGY CORP	B31N1911	11.55Vdc, 42Wh or 3640mAh / 3550mAh	UL 60950-1, 2nd Edition, IEC 60950- 1:2005/AMD2:20 13, EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054 IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-90292- UL, DK-89997- UL, DK-90922- UL)																					
Battery Pack (Alternate)	CELXP ERT ENERGY CORP	C31N1911	11.55Vdc, 42Wh or 3640mAh / 3550mAh	IEC 60950- 1:2005/AMD2:20 13, EN 60950- 1:2006/A2:2013, IEC 62133:2012, EN 62133: 2013, UL 2054, IEC 62368- 1:2014, EN 62368- 1:2014/A11:2017, UL 62368-1, 2nd Edition	UL, CB by Demko (DK-91479- UL, DK-91128- UL, DK-91884- UL)																					
<p>See, e.g., Universal Standard Service, Inc., <i>Test Report IEC 62368-1</i> at 1, 2, 5, 6, 11, 12, 20, 25, 26 (App. No. ASL19082825-003, Mar. 17, 2020) available at https://dlcdnets.asus.com/pub/ASUS/nb/X421JQ/Rep_CB62368_X421xyyyyyyyyyyyyyyyyy M3.pdf.</p>																										

Claims	Identification
	 <p>The image shows the back of a black ASUS M413D laptop. A red rectangular box highlights a label in the center. The label contains the following information:</p> <ul style="list-style-type: none"> ASUS Model / 型番: M413D Notebook PC / 筆記型電腦 Input / 輸入: +19V ~ 2.37A, 45W CONTAINS: REALTEK MODEL: RTL8211CE, QCA916L P2410T3, FOG ID: TXQ-RTL8211CE, IC: 6317A-RTL8211CE 電圧法によりVLS/5.3X% 等は筐内使用に限りです 13.3X% 等高出力ケーブルは システムの基盤周波数は 地上移動中継局と適合する 場合を除く。 M413DA - WS51 SN: M7N0CX08U63528G CN: EGH6 MFD: 2021-07 12M QR Code CE, FC, ENEC, EHC, R-NZ, and other regulatory marks. Made in China / 中国製造 ASUSTek Computer Inc. All rights reserved. CAN ICES-3 (B)/NRC-3(B) CN:3 CQW 11185-6728088  <p>This is a close-up of the label highlighted in the previous image. It contains the same information as the label on the laptop back, including the ASUS model number, input specifications, regulatory marks, and serial number.</p>

Claims	Identification
	 <p>The image shows the internal components of an ASUS laptop, specifically the battery pack and motherboard. A red box highlights the battery label, which contains the following information:</p> <p>ASUS Rating: +11.55V \approx 42Wh Questions ? Please visit www.asus.com Rechargeable Li-Polymer Battery Pack Capacity: 3640mAh(Typical) / 3550mAh(Rated) 製造商: 加百利工业股份有限公司 Manufactured by Celxpert (Kunshan) Energy Co., Ltd. Battery cell made in China, Assembled in China</p> <p>MODEL (型號/型号): C31N1911 3ICP5/58/78 二次鋰電池組 鋰離子電池組 製造地: 中國</p> <p>AVERTISSEMENT 1. Ne pas jeter dans les poubelles. 2. Ne pas exposer à la chaleur ou au feu. 3. Ne pas ouvrir le boîtier. 4. Ne pas décharger complètement la batterie. 5. Ne pas utiliser de produits chimiques ou de produits inflammables. 6. Ne pas utiliser de produits corrosifs ou de produits inflammables. 7. Ne pas utiliser de produits inflammables ou de produits corrosifs. 8. Ne pas utiliser de produits inflammables ou de produits corrosifs. 9. Ne pas utiliser de produits inflammables ou de produits corrosifs. 10. Ne pas utiliser de produits inflammables ou de produits corrosifs.</p> <p>IS 16246/Part 2/IEC 62133-2 www.bbs.gov.in R-41143006 www.bbs.gov.in TIS 2217-2549 ASUS SERVICE (THAILAND) CO., LTD.</p> <p>ASUS Rating: +11.55V \approx 42Wh Questions ? Please visit www.asus.com Rechargeable Li-Polymer Battery Pack Capacity: 3640mAh(Typical) / 3550mAh(Rated) 製造商: 加百利工业股份有限公司 Manufactured by Celxpert (Kunshan) Energy Co., Ltd. Battery cell made in China, Assembled in China</p> <p>MODEL (型號/型号): C31N1911 3ICP5/58/78 二次鋰電池組 鋰離子電池組 製造地: 中國</p> <p>AVERTISSEMENT 1. Ne pas jeter dans les poubelles.</p>

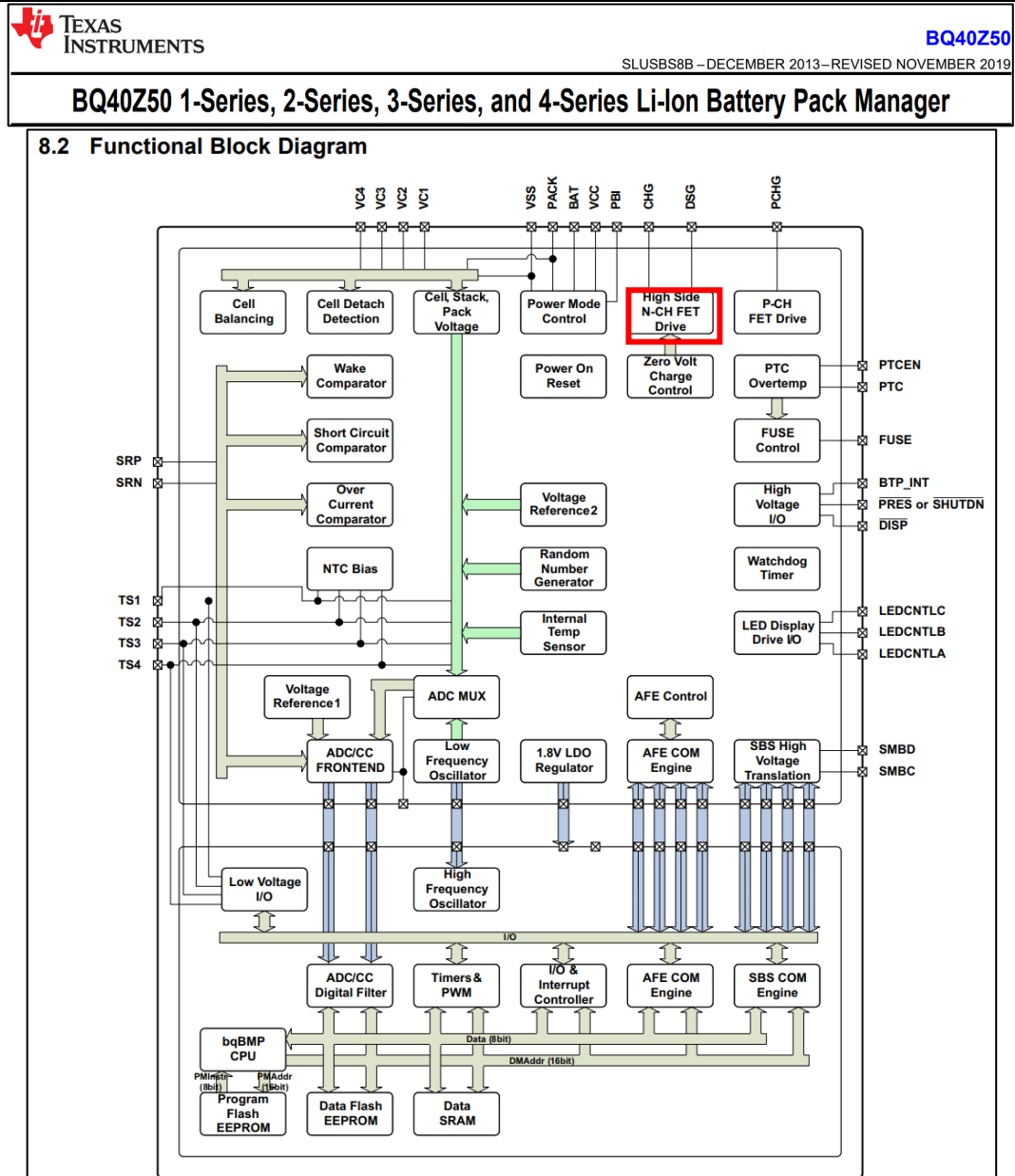
See, e.g., Internal Testing.

Claims	Identification
10[a] employing a power cell to supply current;	<p data-bbox="489 139 1262 172">Asus-branded devices employ a power cell to supply current.</p> <div data-bbox="520 207 1959 768">  <p data-bbox="531 215 722 240">Vivobook 14 M413</p> <p data-bbox="1108 224 1440 240">Overview Feature Review Support</p> <p data-bbox="1255 337 1535 370">Vivobook 14 M413</p> <ul data-bbox="1255 418 1944 646" style="list-style-type: none"> • 14 inch Full HD NanoEdge bezel display with stunning 84% screen-to-body ratio • Powerful AMD Ryzen 5 3500U Processor (2M Cache, up to 3.7 GHz) • 8GB DDR4 RAM and 256GB PCIe SSD and Windows 10 Home • Ergonomic backlit keyboard along with a fingerprint sensor activated via Windows Hello • Comprehensive connections including USB 3.1 Type-C, USB 3.1 Type-A, USB 2.0, and HDMI; Gig + Wi-Fi 6 (802.11ax) (*USB Transfer speed may vary. Learn more at ASUS website) <p data-bbox="1255 695 1476 743">Product Name: M413DA-W551 Part Number: 90NB0R77-M00090</p> </div> <div data-bbox="888 776 1596 857"> <p data-bbox="888 800 982 833">Battery</p> <p data-bbox="1339 800 1577 833">42WHrs, 3S1P 3-cell Li-ion</p> </div> <p data-bbox="489 862 1976 927">See, e.g., <i>Vivobook 14 M413</i>, Asus, https://shop.asus.com/us/90nb0r77-m00090-vivobook-14-m413.html (last visited Feb. 20, 2024).</p> <div data-bbox="709 971 1770 1300">  <p data-bbox="730 987 989 1044">ASUS</p> <p data-bbox="730 1052 1241 1092">Rating: +11.55V 42Wh</p> <p data-bbox="730 1101 1266 1125">Questions ? Please visit www.asus.com</p> <p data-bbox="730 1133 1234 1157">Rechargeable Li-Polymer Battery Pack</p> <p data-bbox="730 1166 1314 1190">Capacity: 3640mAh(Typical) / 3550mAh(Rated)</p> <p data-bbox="730 1198 1052 1222">製造商: 加百裕工业股份有限公司</p> <p data-bbox="730 1230 1335 1255">Manufactured by Celpert (Kunshan) Energy Co., Ltd.</p> <p data-bbox="730 1263 1266 1287">Battery cell made in China, Assembled in China</p> <p data-bbox="1381 1084 1734 1109">MODEL (型號/型号): C31N1911</p> <p data-bbox="1381 1117 1535 1141">3ICP5/58/78</p> <p data-bbox="1381 1149 1745 1174">二次鋰電池組 鋰離子電池組</p> <p data-bbox="1381 1182 1514 1206">製造地: 中國</p> <p data-bbox="1381 1247 1566 1271">AVERTISSEMENT</p> <p data-bbox="1381 1279 1591 1295">4. Non manipuler les bornes</p> </div> <p data-bbox="489 1308 810 1341">See, e.g., Internal Testing.</p>


Claims	Identification
<p>10[b] employing an electronic switch to conduct substantially all of the current passing through the power cell when the electronic switch is in a conducting condition, and to prevent substantially all of the current from passing through the power cell when the electronic switch is in a non-conducting condition;</p>	<p>Asus-branded devices employ an electronic switch to conduct substantially all of the current passing through the power cell when the electronic switch is in a conducting condition, and to prevent substantially all of the current from passing through the power cell when the electronic switch is in a non-conducting condition;</p>  <p><i>See, e.g., Internal Testing (showing a rechargeable battery pack including a PCB including a Texas Instruments BQ40Z50 Li-ion battery pack manager).</i></p>

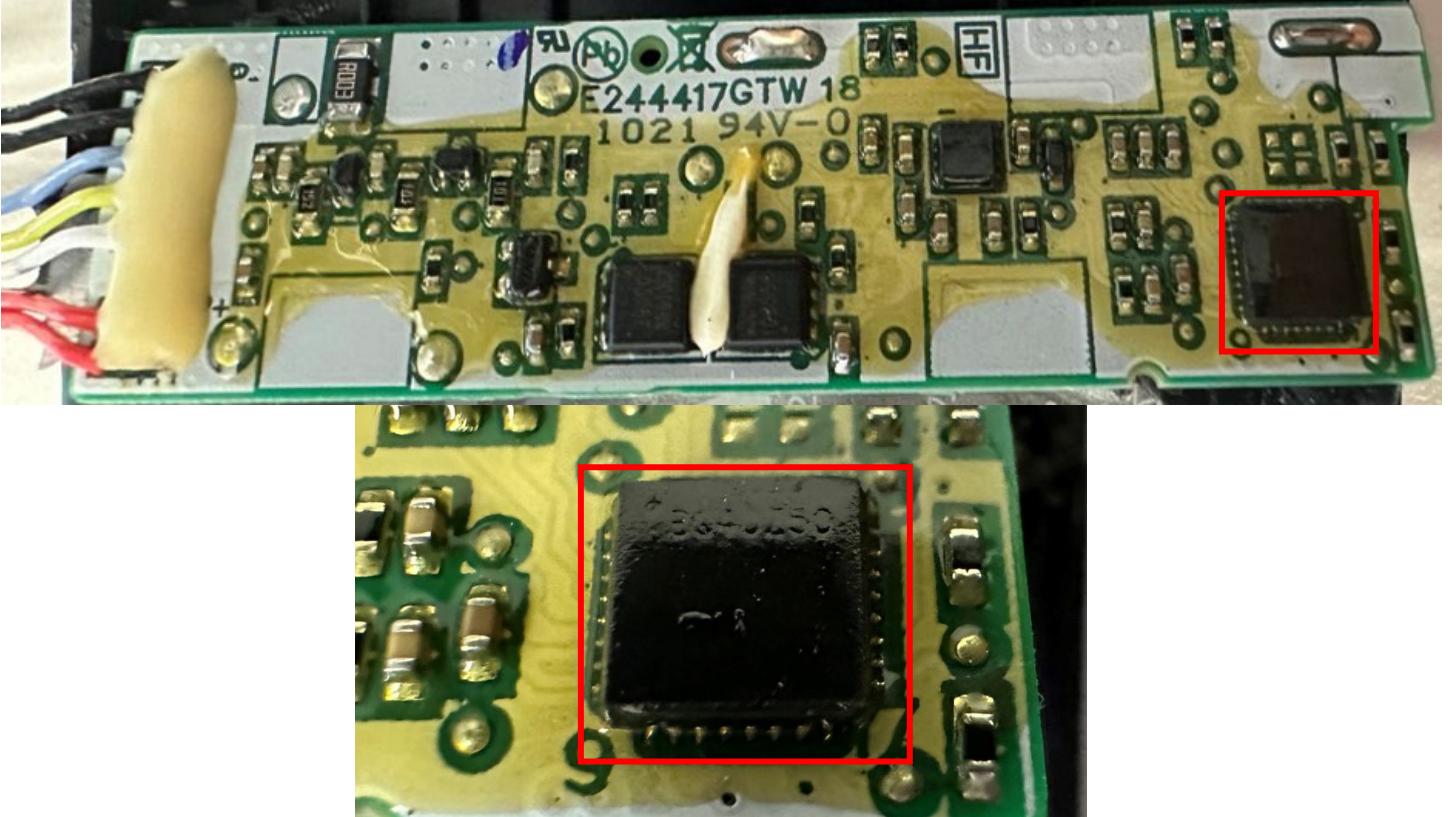
Claims

Identification




See, e.g., Texas Instruments, *Data Sheet: BQ40Z50 1-Series, 2-Series, 3-Series, and 4-Series Li-Ion Battery Pack Manager* (Nov. 2019) available at <https://www.ti.com/lit/ds/symlink/bq40z50.pdf>.

Claims	Identification
	<div data-bbox="667 142 1814 509"> <p>bq40z50</p> <p>Technical Reference</p>  </div> <div data-bbox="667 509 1814 581"> <p>Literature Number: SLUUA43A December 2013–Revised May 2015</p> </div> <div data-bbox="667 581 1814 867"> <p>2.1 Introduction</p> <p>The bq40z50 provides recoverable protection. When the protection is triggered, charging and/or discharging is disabled. This is indicated by the <code>OperationStatus()[XCHG]</code> = 1 when charging is disabled, and/or the <code>OperationStatus()[XDSG]</code> = 1 when discharging is disabled. Once the protection is recovered, charging and discharging resume. All protection items can be enabled or disabled under Settings:Enabled Protections A, Settings:Enabled Protections B, Settings:Enabled Protections C, and Settings:Enabled Protections D.</p> <p>When the protections and permanent fails are triggered, the <code>BatteryStatus()[TCA][TDA][FD][OCA][OTA]</code> is set according to the type of safety protections. A summary of the set conditions of the various alarms flags is available in Section 4.8.</p> </div> <div data-bbox="667 867 1814 1279"> <p>2.7 Hardware-Based Protection</p> <p>The bq40z50 device has three main hardware-based protections—AOLD, ASCC, and ASCD1,2—with adjustable current and delay time. Setting AFE Protection Configuration[RSNS] divides the threshold value in half. The Threshold settings are in mV; therefore, the actual current that triggers the protection is based on the R_{SENSE} used in the schematic design.</p> <p>In addition, setting the AFE Protection Configuration[SCDDx2] bit provides an option to double all of the SCD1,2 delay times for maximum flexibility towards the application's needs.</p> <p>For details on how to configure the AFE hardware protection, refer to the tables in Appendix A.</p> <p>All of the hardware-based protections provide a Trip/Latch Alert/Recovery protection. The latch feature stops the FETs from toggling on and off continuously on a persistent faulty condition.</p> <p>In general, when a fault is detected after the Delay time, both CHG and DSG FETs will be disabled (Trip stage), and an internal fault counter will be incremented (Alert stage). Since both FETs are off, the current will drop to 0 mA. After Recovery time, the CHG and DSG FETs will be turned on again (Recovery stage).</p> </div> <p>See, e.g., Texas Instruments, <i>bq40z50 Technical Reference</i> (May 2015) available at https://www.ti.com/lit/ug/sluea43a/sluea43a.pdf.</p>

Claims	Identification
<p>10[c] employing a thermal protection circuit to monitor for an overtemperature condition and to cause the electronic switch to assume the non-conducting condition when the overtemperature condition exists; and providing a negligible current from the power cell to the thermal protection circuit.</p>	<p>Asus-branded devices employing a thermal protection circuit to monitor for an overtemperature condition and to cause the electronic switch to assume the non-conducting condition when the overtemperature condition exists; and provide a negligible current from the power cell to the thermal protection circuit.</p>  <p><i>See, e.g., Internal Testing (showing a rechargeable battery pack including a PCB including a Texas Instruments BQ40Z50 Li-ion battery pack manager).</i></p>

Claims	Identification
	<div data-bbox="667 139 1814 305"> <p>9.2.2.3.4 Temperature Output</p> <p>For the BQ40Z50 device, TS1, TS2, TS3, and TS4 provide thermistor drive-under program control. Each pin can be enabled with an integrated 18-kΩ (typical) linearization pullup resistor to support the use of a 10-kΩ at 25°C (103) NTC external thermistor such as a Mitsubishi BN35-3H103. The reference design includes four 10-kΩ thermistors: RT1, RT2, RT3, and RT4. The BQ40Z50 device supports up to four external thermistors. Connect unused thermistor pins to V_{SS}.</p> </div> <div data-bbox="869 321 1608 987"> </div> <div data-bbox="1150 1003 1612 1027"> <p>Copyright © 2016, Texas Instruments Incorporated</p> </div> <div data-bbox="1045 1049 1440 1081"> <p>Figure 34. Thermistor Drive</p> </div> <div data-bbox="667 1089 1814 1239"> <p>9.2.2.3.6 Safety PTC Thermistor</p> <p>The BQ40Z50 device provides support for a safety PTC thermistor. The PTC thermistor is connected between the PTC pin and V_{SS}. It can be placed close to the CHG/DSG FETs to monitor the temperature. The PTC pin outputs a very small current, typical ~370 nA, and the PTC fault will be triggered at ~0.7 V typical. A PTC fault is one of the permanent failure modes. It can only be cleared by a POR.</p> </div> <p>See, e.g., Texas Instruments, <i>Data Sheet: BQ40Z50 1-Series, 2-Series, 3-Series, and 4-Series Li-Ion Battery Pack Manager</i> (Nov. 2019), available at https://www.ti.com/lit/ds/symlink/bq40z50.pdf.</p>

Claims	Identification
	<div data-bbox="667 139 1814 509"> <p data-bbox="667 139 865 196">bq40z50</p> <p data-bbox="667 277 1289 342">Technical Reference</p>  </div> <div data-bbox="667 509 1814 578"> <p data-bbox="1087 516 1388 570">Literature Number: SLUUA43A December 2013–Revised May 2015</p> </div> <div data-bbox="667 578 1814 984"> <p data-bbox="667 586 1062 613">2.7 Hardware-Based Protection</p> <p data-bbox="737 626 1808 732">The bq40z50 device has three main hardware-based protections—AOLD, ASCC, and ASCD1,2—with adjustable current and delay time. Setting AFE Protection Configuration[RSNS] divides the threshold value in half. The Threshold settings are in mV; therefore, the actual current that triggers the protection is based on the R_{SENSE} used in the schematic design.</p> <p data-bbox="737 740 1808 792">In addition, setting the AFE Protection Configuration[SCDDx2] bit provides an option to double all of the SCD1,2 delay times for maximum flexibility towards the application's needs.</p> <p data-bbox="737 805 1688 833">For details on how to configure the AFE hardware protection, refer to the tables in Appendix A.</p> <p data-bbox="737 841 1766 893">All of the hardware-based protections provide a Trip/Latch Alert/Recovery protection. The latch feature stops the FETs from toggling on and off continuously on a persistent faulty condition.</p> <p data-bbox="737 901 1808 984">In general, when a fault is detected after the Delay time, both CHG and DSG FETs will be disabled (Trip stage), and an internal fault counter will be incremented (Alert stage). Since both FETs are off, the current will drop to 0 mA. After Recovery time, the CHG and DSG FETs will be turned on again (Recovery stage).</p> </div>

Claims	Identification															
	<div><div>2.8 Temperature Protections</div><div><p>The device provides overtemperature and undertemperature protections based on Cell Temperature measurement and FET temperature measurements. The Cell Temperature based protections are further divided into a protection-in-charging direction and discharging directions. This section describes in detail each of the protection functions.</p><div><p>For temperature reporting, the device supports a maximum of four external thermistors and one internal temperature sensor. Unused temperature sensors must be disabled by clearing the corresponding flag in Settings:Temperature Enable[TS4][TS3][TS2][TS1][TSInt].</p><p>Each of the external thermistors and the internal temperature sensor can be set up individually as a source for Cell Temperature or FET Temperature reporting. Setting the corresponding flag to 1 in Settings:Temperature Mode[TS4 Mode][TS3 Mode][TS2 Mode][TS1 Mode][TSInt Mode] configures that temperature sensor to report for FET Temperature. Clearing the corresponding flag sets that temperature sensor to report for Cell Temperature. The Settings:DA Configuration[FTEMP][CTEMP] allows users to use the maximal (setting the corresponding flag to 0) or the average (setting the corresponding flag to 1) of the source temperature sensors for Cell Temperature and FET Temperature reporting.</p></div><p>The <i>Temperature()</i> command returns the Cell Temperature measurement. The MAC and extended command <i>DAStatus2()</i> also returns the temperature measurement from the internal temperature sensor, the external thermistors TS1, TS2, TS3, and TS4, and the Cell and FET Temperatures.</p><div><p>The Cell Temperature based overtemperature and undertemperature safety provide protections in charge and discharge conditions. The battery pack is considered in CHARGE mode when <i>BatteryStatus()[DSG]</i> = 0, where <i>Current()</i> > Chg Current Threshold. The overtemperature and undertemperature in charging protections are active in this mode. The <i>BatteryStatus()[DSG]</i> is set to 1 in a NON-CHARGE mode condition, which includes RELAX and DISCHARGE modes. The overtemperature and undertemperature in discharge protections are active in these two modes. See Section 6.3 for detailed descriptions of the gas gauge modes.</p></div></div></div> <div><div>2.9 Overtemperature in Charge Protection</div><div><p>The device has an overtemperature protection for cells under charge.</p><table><tr><th>Status</th><th>Condition</th><th>Action</th></tr><tr><td>Normal</td><td><i>Temperature()</i> < OTC:Threshold OR not charging</td><td><i>SafetyAlert()[OTC]</i> = 0</td></tr><tr><td>Alert</td><td><i>Temperature()</i> ≥ OTC:Threshold AND charging</td><td><i>SafetyAlert()[OTC]</i> = 1 <i>BatteryStatus()[TCA]</i> = 1</td></tr><tr><td>Trip</td><td><i>Temperature()</i> ≥ OTC:Threshold AND Charging for OTC:Delay duration</td><td><i>SafetyAlert()[OTC]</i> = 0 <i>SafetyStatus()[OTC]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 1 if FET Options[OTFET] = 1.</td></tr><tr><td>Recovery</td><td><i>SafetyStatus()[OTC]</i> AND <i>Temperature()</i> ≤ OTC:Recovery</td><td><i>SafetyStatus()[OTC]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 0</td></tr></table></div></div>	Status	Condition	Action	Normal	<i>Temperature()</i> < OTC:Threshold OR not charging	<i>SafetyAlert()[OTC]</i> = 0	Alert	<i>Temperature()</i> ≥ OTC:Threshold AND charging	<i>SafetyAlert()[OTC]</i> = 1 <i>BatteryStatus()[TCA]</i> = 1	Trip	<i>Temperature()</i> ≥ OTC:Threshold AND Charging for OTC:Delay duration	<i>SafetyAlert()[OTC]</i> = 0 <i>SafetyStatus()[OTC]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 1 if FET Options[OTFET] = 1.	Recovery	<i>SafetyStatus()[OTC]</i> AND <i>Temperature()</i> ≤ OTC:Recovery	<i>SafetyStatus()[OTC]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 0
Status	Condition	Action														
Normal	<i>Temperature()</i> < OTC:Threshold OR not charging	<i>SafetyAlert()[OTC]</i> = 0														
Alert	<i>Temperature()</i> ≥ OTC:Threshold AND charging	<i>SafetyAlert()[OTC]</i> = 1 <i>BatteryStatus()[TCA]</i> = 1														
Trip	<i>Temperature()</i> ≥ OTC:Threshold AND Charging for OTC:Delay duration	<i>SafetyAlert()[OTC]</i> = 0 <i>SafetyStatus()[OTC]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 1 if FET Options[OTFET] = 1.														
Recovery	<i>SafetyStatus()[OTC]</i> AND <i>Temperature()</i> ≤ OTC:Recovery	<i>SafetyStatus()[OTC]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>BatteryStatus()[TCA]</i> = 0 <i>OperationStatus()[XCHG]</i> = 0														

Claims	Identification																								
	<div><div><div><h3>2.10 Overtemperature in Discharge Protection</h3><p>The device has an overtemperature protection for cells in DISCHARGE or RELAX state (that is, non-charging state with <i>BatteryStatus[DSG] = 1</i>).</p><table><thead><tr><th>Status</th><th>Condition</th><th>Action</th></tr></thead><tbody><tr><td>Normal</td><td><i>Temperature()</i> < <i>OTD:Threshold</i> OR charging</td><td><i>SafetyAlert()[OTD]</i> = 0</td></tr><tr><td>Alert</td><td><i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>)</td><td><i>SafetyAlert()[OTD]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1</td></tr><tr><td>Trip</td><td><i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>) for <i>OTD:Delay</i> duration</td><td><i>SafetyAlert()[OTD]</i> = 0 <i>SafetyStatus()[OTD]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>OperationStatus()[XDSG]</i> = 1 if <i>FET Options[OTFET]</i> = 1. <i>BatteryStatus()[TDA]</i> = 0</td></tr><tr><td>Recovery</td><td><i>SafetyStatus()[OTD]</i> AND <i>Temperature()</i> ≤ <i>OTD:Recovery</i></td><td><i>SafetyStatus()[OTD]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>OperationStatus()[XDSG]</i> = 0 <i>BatteryStatus()[TDA]</i> = 0</td></tr></tbody></table></div></div><div><div><h3>3.19 PTC Permanent Fail</h3><p>The device can detect overtemperature using a positive temperature coefficient (PTC) resistor connected to the PTC pin. This protection also works in SHUTDOWN mode.</p><p>If the device detects a PTC pin high state, the CHG and DSG FETs are turned off, and the pack is disabled permanently. For manufacturer testing, the fault state can be reset by a full power cycle of the device.</p><p>This is a hardware controlled feature. To enable this feature, the PTCEN pin should be tied to BAT. To disable this feature, connect the PTCEN pin to ground.</p><table><thead><tr><th>Status</th><th>Condition</th><th>Action</th></tr></thead><tbody><tr><td>Normal</td><td>Reset AFE and PTC pin = low</td><td><i>PFStatus()[PTC]</i> = 0</td></tr><tr><td>Trip</td><td>PTC pin = high</td><td><i>PFStatus()[PTC]</i> = 1 FUSE = high <i>BatteryStatus()[TCA]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1</td></tr></tbody></table></div></div></div>	Status	Condition	Action	Normal	<i>Temperature()</i> < <i>OTD:Threshold</i> OR charging	<i>SafetyAlert()[OTD]</i> = 0	Alert	<i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>)	<i>SafetyAlert()[OTD]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1	Trip	<i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>) for <i>OTD:Delay</i> duration	<i>SafetyAlert()[OTD]</i> = 0 <i>SafetyStatus()[OTD]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>OperationStatus()[XDSG]</i> = 1 if <i>FET Options[OTFET]</i> = 1. <i>BatteryStatus()[TDA]</i> = 0	Recovery	<i>SafetyStatus()[OTD]</i> AND <i>Temperature()</i> ≤ <i>OTD:Recovery</i>	<i>SafetyStatus()[OTD]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>OperationStatus()[XDSG]</i> = 0 <i>BatteryStatus()[TDA]</i> = 0	Status	Condition	Action	Normal	Reset AFE and PTC pin = low	<i>PFStatus()[PTC]</i> = 0	Trip	PTC pin = high	<i>PFStatus()[PTC]</i> = 1 FUSE = high <i>BatteryStatus()[TCA]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1
Status	Condition	Action																							
Normal	<i>Temperature()</i> < <i>OTD:Threshold</i> OR charging	<i>SafetyAlert()[OTD]</i> = 0																							
Alert	<i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>)	<i>SafetyAlert()[OTD]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1																							
Trip	<i>Temperature()</i> ≥ <i>OTD:Threshold</i> AND Not charging (that is, <i>BatteryStatus[DSG] = 1</i>) for <i>OTD:Delay</i> duration	<i>SafetyAlert()[OTD]</i> = 0 <i>SafetyStatus()[OTD]</i> = 1 <i>BatteryStatus()[OTA]</i> = 1 <i>OperationStatus()[XDSG]</i> = 1 if <i>FET Options[OTFET]</i> = 1. <i>BatteryStatus()[TDA]</i> = 0																							
Recovery	<i>SafetyStatus()[OTD]</i> AND <i>Temperature()</i> ≤ <i>OTD:Recovery</i>	<i>SafetyStatus()[OTD]</i> = 0 <i>BatteryStatus()[OTA]</i> = 0 <i>OperationStatus()[XDSG]</i> = 0 <i>BatteryStatus()[TDA]</i> = 0																							
Status	Condition	Action																							
Normal	Reset AFE and PTC pin = low	<i>PFStatus()[PTC]</i> = 0																							
Trip	PTC pin = high	<i>PFStatus()[PTC]</i> = 1 FUSE = high <i>BatteryStatus()[TCA]</i> = 1 <i>BatteryStatus()[TDA]</i> = 1																							
	<p>See, e.g., Texas Instruments, <i>bq40z50 Technical Reference</i> (May 2015) available at https://www.ti.com/lit/ug/sl00043a/sl00043a.pdf.</p>																								